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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/597,713

08/04/2006

Jens Wiegert

DE040043US1

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04/10/2009

PHILIPS INTELLECTUAL PROPERTY & STANDARDS

P.O. BOX 3001

BRIARCLIFF MANOR, NY 10510

EXAMINER

BITAR, NANCY

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

04/10/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/597,713 | Applicant(s) WIEGERT ET AL. | |
| | Examiner NANCY BITAR | Art Unit 2624 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's response to the last Office Action, filed 10/1/2008, has been entered and made of record.
2. Applicant has amended claims 1-2, 4-10. Claims 3 have been cancelled. Claims 1-2, 4-10 are currently pending.
3. Applicants arguments filed 12/29/2008 have been fully considered but are moot in view of the new ground(s) of rejection necessitated by the amendments. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Ohishi et al (2003/0031299)

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 9 recites the limitation "the reconstructed x-ray density"" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Examiner Notes

6. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1- 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reader et al in view of Reader et al (Adaptive Correction of Scatter and random events for 3D back projected Pet data) in view of Watson et al (New, Faster, Image based scatter correction for 3D PET; IEEE 2000).

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1- 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Reader et al (Adaptive Correction of Scatter and random events for 3D back projected Pet data) in view of Ohishi et al (2003/0031299) .

As to claim 1, Reader et al teaches an apparatus for the processing of a sectional image that is reconstructed from X-ray projections of an object from different directions, the apparatus programmed to execute the following steps: a) segmenting at least one segmented area from the sectional image where the reconstructed x-ray density within said at least one segmented area lies within a given density interval (the reconstructed image was segmented as shown in figure 1 and 2 a hot region and a background region, page 1352 , right column; figure 1), b) determination a baseline function (page 1352, left column,” Gaussian background function, eq. (14) that describes spatially slowly varying artifacts of the sectional image based on the data of said at least one segmented area (scatter background, page 1350, right column, 2nd paragraph) ; c) calculating a corrected image by compensating the original sectional image with the help of said baseline function (page 1352, left column, steps 5-9). While Reader meets a number of the limitations of the claimed invention, as pointed out more fully above, Reader fails to specifically teach the “reconstructed x-ray density within said at least one segmented area lies within a given density interval” Specifically, Ohishi et al. teaches an image processing apparatus is provided for processing a plurality of sets of projection data acquired by radiating an X-ray onto an object in a multitude of directions. The apparatus has a correcting unit and a reconstructing unit. The correcting unit corrects the projection data with regard to beam hardening of the projection data. The beam hardening is caused due to a contrast agent injected into the object. For example, the

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correcting unit includes a correction table defining a correcting value to a change in densities of a region in which the contrast agent is present and corrects the projection data on the basis of the correcting value obtained from the correction table. The reconstructing unit reconstructs the corrected projection data into an image of the object. (See abstract, paragraph [0012-0013], figure 12). It would have been obvious to one of ordinary skill in the art to reconstruct the x-ray density within the segmented area that lies in a given interval as taught by Ohishi in order to avoid artifacts due to beam hardening resultant from use of the contrast agent. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 4, Reader et al teaches an apparatus according to claim 3, wherein the baseline function (B) is determined by fitting a parametric model function to the data in the segmented areas (M) (where r and z are the radial and axial directions, respectively, and the three parameters, and (the amplitude and the two direction decay constants) are to be adapted according to the unique imaging situation. To determine the kernel parameters to use for (4); see page 1351, left column, eq (6)).

As to claim 5, Reader et al teaches an apparatus according to claim 4, wherein the parametric model function is a spline function and/or a polynomial, preferably a polynomial of sixth degree (Gaussian function, page 1351, note that the features of using polynomials or splines instead of the Gaussian function is well known to select out of several straightforward possibilities).

As to claims 6-7, Reader et al teaches an apparatus according to claim 3, wherein the baseline function is determined by low-pass filtering of the data in the segmented areas (M) (

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The background is modeled by convolution with a exponential kernel eq.(5) which is equivalent to low pass filtering , page 1350, right column, equ(4)).

As to claim8, Reader et al teaches an apparatus according to claim 1, wherein image areas outside the object are segmented and excluded from the correction with the baseline function (B) (figure 1 and figure 2)

Claim 10 differ from claim 1 only in that claim 10 is a method claim whereas; claim 1 is an apparatus claim. Thus, claim 10 is analyzed as previously discussed with respect to claim 1above.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 2 and 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reader et al in view Ohishi et al (2003/0031299) and further in view of Watson et al (New, Faster, Image based scatter correction for 3D PET; IEEE 2000).

While Reader meets a number of the limitations of the claimed invention, as pointed out more fully above, Reader teaches the 3D fitting function but fails to specifically teach computing individual scatter distributions for each image slice fails and that the corresponding three-dimensional baseline function (B) is composed of separate two-dimensional baseline functions that are calculated for two-dimensional slices of the sectional image (I). Specifically, Watson et

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al. teaches (see pages 1588-1589) a scatter estimate computed from an uncorrected image using a single-scatter operator approximately compensates for multiple scatter (see also figures 4 and 5. It would have been obvious to one of ordinary skill in the art to modeling the baseline function separately for each slice in order to operate fast and achieve a smooth function all over the whole volume. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nancy Bitar/
Examiner, Art Unit 2624

/Vikkram Bali/
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